

- 16 -

C L A I M S

1. Tyre (3; 30) for vehicles, in particular for motor vehicles, which has an axis (13) of symmetry and comprises a tread (16), two sidewalls (15), two beads (8) which are attached to a wheel rim (2) made of elastomer material, and at least one tubular reinforcement body (18;35) for coaxial reinforcement on the said axis (13), which is surrounded by the said tread (16) and extends between the said sidewalls (15); each of the said sidewalls comprising a respective resilient annular membrane (24) with a straight generatrix which forms an angle (A) other than 90° with the axis (13) of the tyre (3); characterised in that the said tubular reinforcement body (35) comprises an annular belt (36) and a plurality of blocks (37) which are supported by the said annular belt in positions adjacent to one another, and can be forced against one another in order to apply resistance to the circumferential actions of compression present on the tyre during the rotation of the tyre itself.
2. Tyre according to claim 1, characterised in that the said tubular body (18;35) has a dimension measured parallel to the said axis (13) which is substantially the same as that of the tread (16) measured in the same direction.
3. Tyre according to claim 1 or 2, characterised in that the said tubular body (18;35) has lateral through-apertures (21).

- 17 -

4. Tyre according to claim 3, characterised in that at least some of the said through-apertures (21) are apertures which are elongate in the circumferential direction.

5

5. Tyre according to claim 3 or 4, characterised in that at least some of the said apertures (21) are aligned with one another circumferentially in order to form a circumferential row of apertures.

10

6. Tyre according to claim 5, characterised in that the said tubular body (18;35) comprises at least one pair of the said circumferential rows of apertures which are spaced from one another in the axial direction.

15

7. Tyre according to any one of the preceding claims, characterised in that the said tubular body (18;35) is delimited by respective cylindrical surfaces which are coaxial to the axis (13); at least one of the said cylindrical surfaces has a generatrix line which is straight and parallel to the axis (13) of the tyre (3).

20

8. Tyre according to one of claims 1 to 6, characterised in that the said tubular body (18) is a corrugated body.

25

9. Tyre according to claim 8, characterised in that the said tubular body has at least one circumferential rib (19).

30

10. Tyre according to any one of the preceding claims,

- 18 -

characterised in that the said tubular body (18) is made of harmonic steel.

11. Tyre according to any one of claims 1 to 9,
5 characterised in that the said tubular body (18;35) is made of plastics material.

12. Tyre according to any one of the preceding claims,
characterised in that the tubular body (18;35) is at
10 least partially embedded in the said tread (16).

13. Tyre according to any one of the preceding claims,
characterised in that the said membranes (24) are
made of anisotropic material.

15
14. Tyre according to claim 13, characterised in that
the said membranes (24) are reinforced with fibres
which are disposed and oriented such as to prevent
localised deformations of the membranes in a loaded
20 condition.

15. Tyre according to claim 14, characterised in that
the said membranes (24) are reinforced such as to
contain the tension forces which are present on the
25 membranes (24) themselves in static load conditions
above a dihedron (26) which is tangent to the beads
(8) and has a vertex parallel to the axis (13).

16. Tyre according to any one of the preceding claims,
30 characterised in that the generatrices of the said
membranes (24) converge towards one another in order
to meet at a point outside the tread (16).

- 19 -

17. Tyre according to any one of claims 1 to 15,
characterised in that the generatrices of the said
membranes (24) converge towards one another in order
5 to meet at a point inside the tyre (3).

18. Tyre according to any one of the preceding claims,
characterised in that the said membranes (24) have
cross-sections which are substantially constant in a
10 radial direction.

19. Tyre according to claim 18, characterised in that
the said cross-sections are substantially rectangular
cross-sections.

15

20. Tyre according to any one of the preceding claims,
characterised in that the said beads (8) comprise at
~~least one annular projection (9) which can engage~~
with a corresponding retention seat (7) when it is
20 fitted onto the wheel rim (2).

21. Tyre according to any one of the preceding claims,
characterised in that the said tread (16) comprises a
plurality of apertures (20) for communication with
25 the interior of the tyre; the said apertures (20)
being provided to correspond with an equivalent
number of apertures (21) provided through the said
tubular body (18;35).

30 22. Tyre according to claim 21, characterised in that
the said apertures are closed by means of materials
which are permeable to water, and can prevent the

- 20 -

intake of foreign bodies into the tyre.

23. Tyre according to claim 22, characterised in that
the said materials which are permeable to water are
porous materials.

24. Tyre according to any one of the preceding claims,
characterised in that the said tread (16) is
vulcanised onto an outer surface of the said tubular
body (18;35).

25. Tyre according to any one of the preceding claims,
characterised in that the said tread (16) comprises a
plurality of outer circumferential grooves (22), and
in that the said grooves communicate with the
interior of the tyre via a plurality of through-
radial passages (20,21).

26. Tyre according to any one of the preceding claims,
characterised in that the said membranes (24) are
stretched radially between the said tread and the
said beads (8) such as to be pre-tensioned in the
absence of loads on the tyre.

27. Tyre according to any one of claims 1 to 12,
characterised in that the said membranes (24) are
made of homogeneous elastomer material.

28. Tyre according to claim 27, characterised in that
the said homogeneous material is an isotropic
material.

- 21 -

29. Tyre according to claim 27 or 28, characterised in that the said membranes (24) are made of polybutadiene rubbers.

5 30. Tyre according to claim 27 or 28, characterised in that the said membranes (24) are made of polyisoprene rubbers.

10 31. Tyre according to claim 27 or 28, characterised in that the material of which the said membranes (24) are made comprises polycondensate of dimethylsilanol, wherein the methyl units are substituted by vinyl or phenolic units.

15 32. Tyre according to anyone of the preceding claims, characterised in that the said blocks (37) project from the said annular belt (36) towards the interior of the tyre.

20 33. Tyre according to anyone of the preceding claims, characterised in that the said annular belt (36) comprises a plurality of reinforcement threads or strips (39).

25 34. Tyre according to claim 33, characterised in that the said annular belt (36) comprises a portion (38) of elastomer material in which the said reinforcement threads or strips (39) are embedded.

30 35. Tyre according to claim 33 or 34, characterised in that the said annular belt (36) is connected integrally to the said tread (16).

- 22 -

36. Tyre according to claim 33 or 34, characterised in that the said tread is connected to the said annular belt (36) in a manner such that it can be released,
5 so that it can be replaced when it reaches a wear limit.

37. Tyre according to any one of claims 34 to 36, characterised in that the said annular belt (36) is
10 glued to the said tread (16).

38. Tyre according to any one of the preceding claims, characterised in that the said blocks (37) are tapered towards the interior of the tyre.
15

39. Tyre according to claim 38, characterised in that the said blocks (39) delimit between one another notches (47) which extend in a direction
substantially parallel to the said axis (13).
20

40. Tyre according to claim 38 or 39, characterised in that the said blocks (37) are distributed in order to form a plurality of axial rows (41) parallel to the said axis (13) and a plurality of circumferential
25 rows (42).

41. Tyre according to any one of claims 38 to 40, characterised in that the said blocks (37) are connected to one another by relative mobility means (43;53) which can permit displacement of the blocks (37) relative to one another during the rotation of the tyre (3).
30

- 23 -

42. Tyre according to claim 41, characterised in that the said relative mobility means are virtual hinges (44; 53,54).

5

43. Tyre according to claim 42, characterised in that the said blocks (37) are connected to one another by connection portions (43) which define the said relative mobility means; the said blocks (37) and the said connection portions constituting part of a body (45) made in a single piece.

10

44. Tyre according to claim 43, characterised in that it additionally comprises means for reaction (52a) which, during the rotation of the tyre, can apply action which opposes that which generates the relative displacement of the said blocks (37).

15

45. Tyre according to claim 44, characterised in that the said means for reaction are interposed between the belt (36) and the blocks (37).

20

46. Tyre according to any one of the preceding claims, characterised in that the said blocks (37) are solid bodies.

25

47. Tyre according to any one of the preceding claims, characterised in that the said blocks (37) are hollow bodies.

30

48. Tyre according to claim 47, characterised in that the said tubular reinforcement body (35) has an

- 24 -

alveolar structure.

5 49. Tyre according to any one of claims 44 to 46, characterised in that the said blocks (37) are connected integrally to the said belt (36) by being glued or vulcanised.

10 50. Wheel rim (2) for vehicles, comprising an inner portion (5), two radial annular portions (6) which project from the said inner portion (5) and support respective seats (7) for accommodation of corresponding beads (8), and a tyre (3) produced according to claim 1, and a wall (12) which extends between the said annular portions (6) coaxially to an axis (13) of the wheel rim (2), and in use faces the said tyre (3), characterised in that the said wall (12) comprises a plurality of through-apertures (21) which are permanently open.

20 51. Wheel rim according to claim 50, characterised in that it comprises an annular portion (31) which is coaxial to the said axis (13) and is made of elastomer material; the said annular portion (31) defining a radial support stop for the said tread (16).

25

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☒ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☒ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER: _____**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.